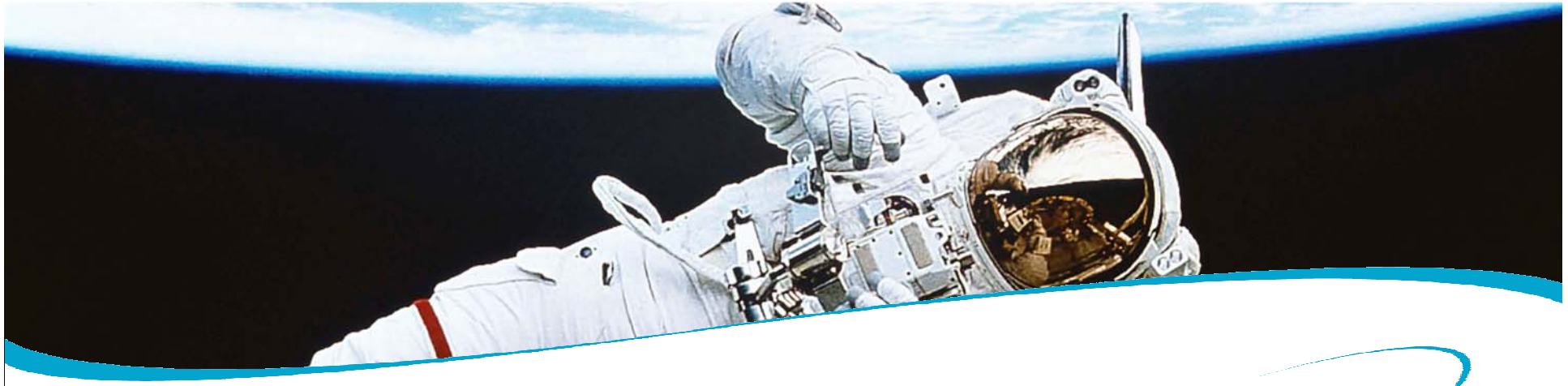


ThalesAlenia Space
A Thales / Finmeccanica Company

SATSIX satellite system and network

INNSS07, Budapest 7th July

SatSix

THALES

Corporate Communications

April 2007

Introduction

- **System and network requirements definition**
  - System Service requirements
    - Corporate
    - Residential
    - Collective
  - **NETWORK, TOPOLOGY, CONNECTIVITY and SERVICES**
    - **SATSIX Network architecture**
  - **NEW FEATUREs**
    - DVB-S2 support
    - Fully IPv4 & IPv6 support
    - ULE/GSE
    - Mobility
    - WiFi/WiMAX interworking

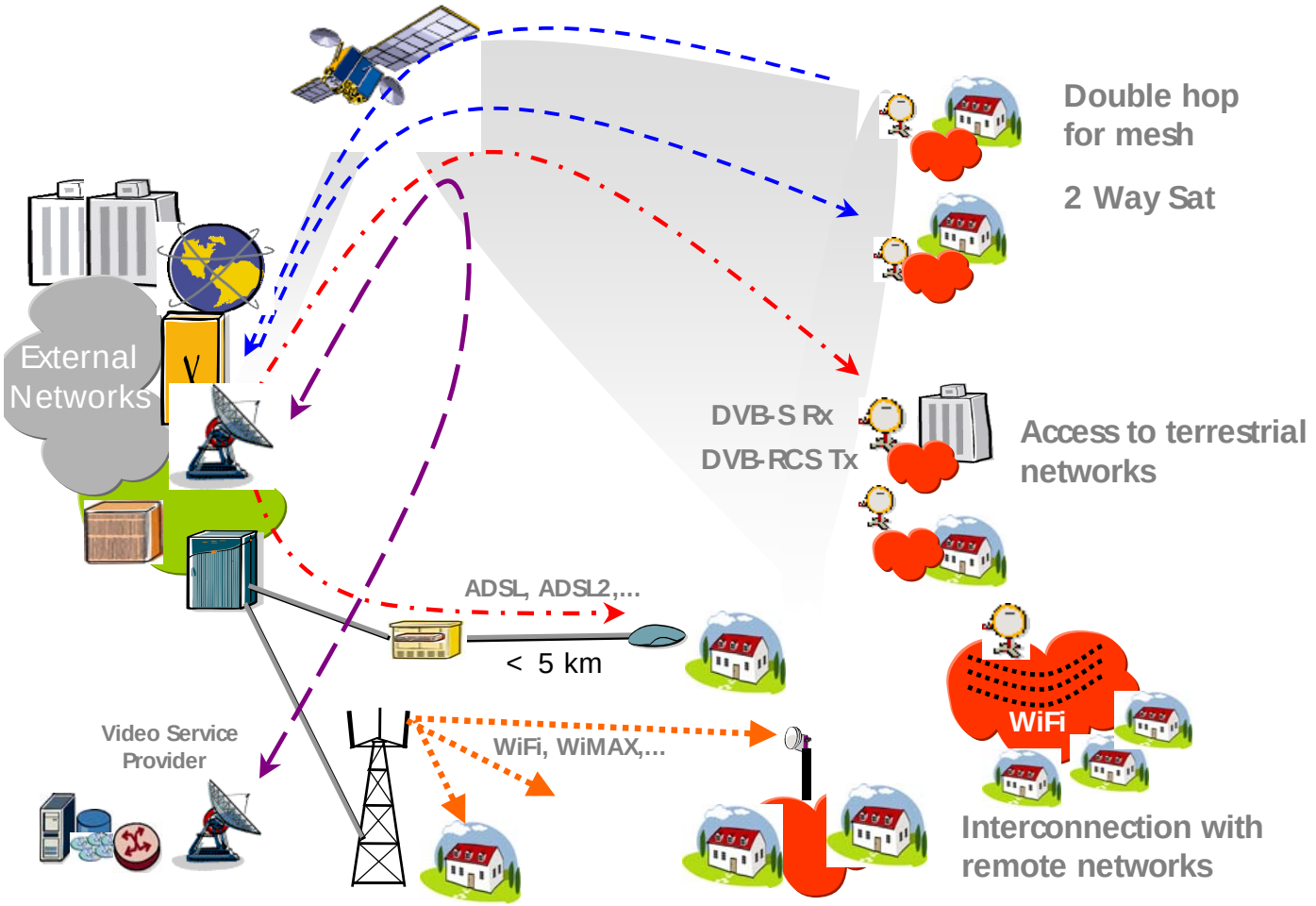
SATSIX System Services Req (I)

Service	Corporate Scenario	Residential Scenario	Collective Scenario
Internet / Intranet access	X	X	X
Web Browsing	X	X	X
FTP	X	X	X
E-mail	X	X	X
Peer-to-Peer		X	X
E-Services (e-medecine, e-commerce, e-government, e-learning)			X
VoIP and Video conferencing	X	X	X
Video Broadcast Service		X	X

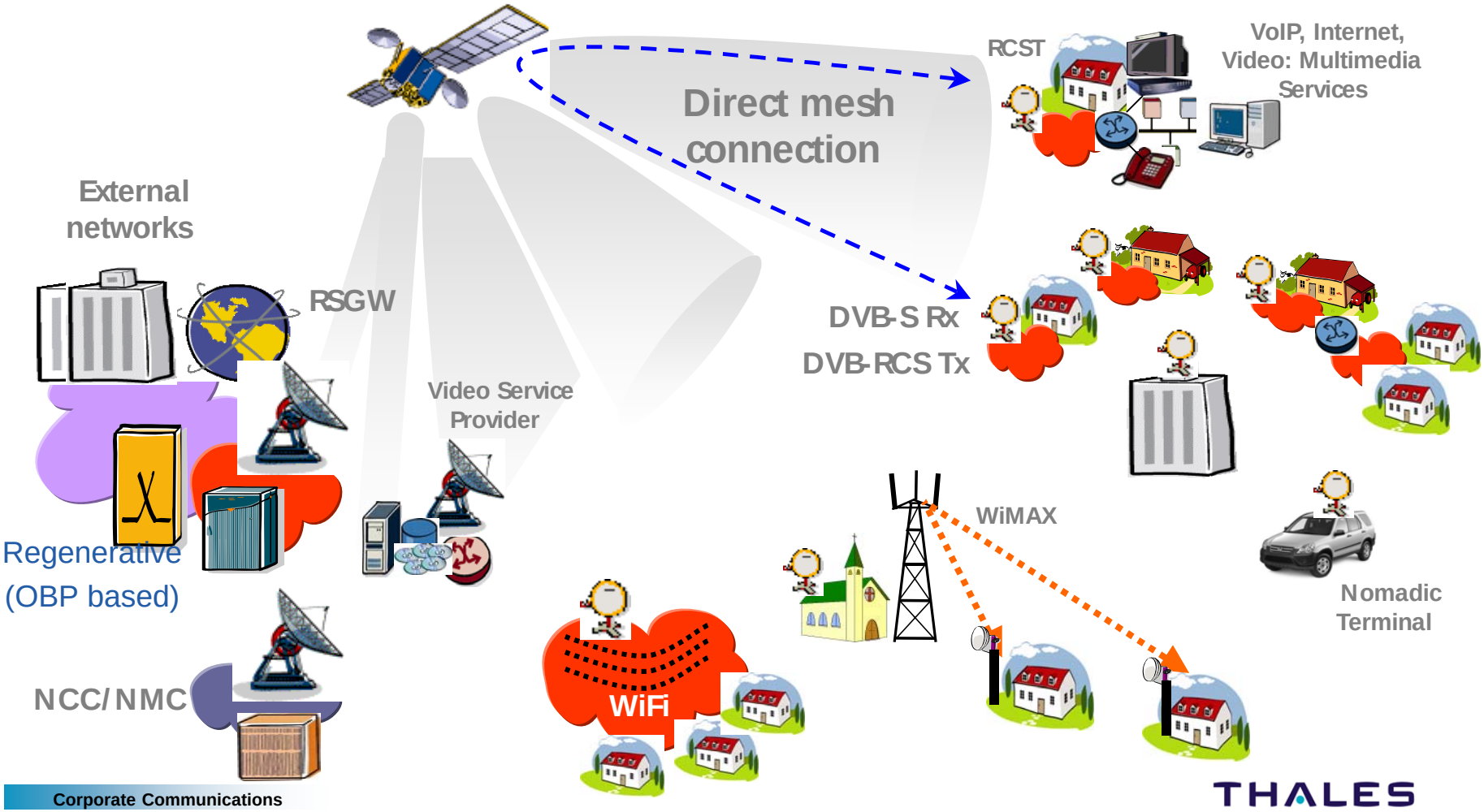
SATSIX System Services Req (II)

	Corporate scenario	Residential Scenario	Collaborative scenario
Audio and Video on-demand (streaming)		X	X
Alert messages	X	X	X
Media content download (Store & Forward)	X	X	X
Interactive gaming		X	X
Software downloads	X	X	X
Remote Control of Applications	X		
Shared applications	X	X	X
Video surveillance	X	X	X
Web conference	X		X

TRANSPARENT PLATFORM

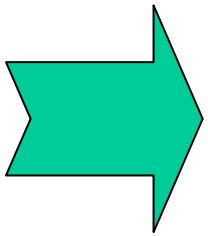


REGENERATIVE PLATFORM



SATSIX NETWORK ELEMENTS

- **TRANSPARENT**
  - HUB (GW/NCC)
  - RCST
  - Feeder (SP)
  - Set Top Box (DVB-S2)
- **REGENERATIVE**
  - MS: NCC/NMC
  - OBP
  - RCST
  - VSP (SP + SP_RCST)
  - RSGW
  - Set Top Box (DVB-S2)

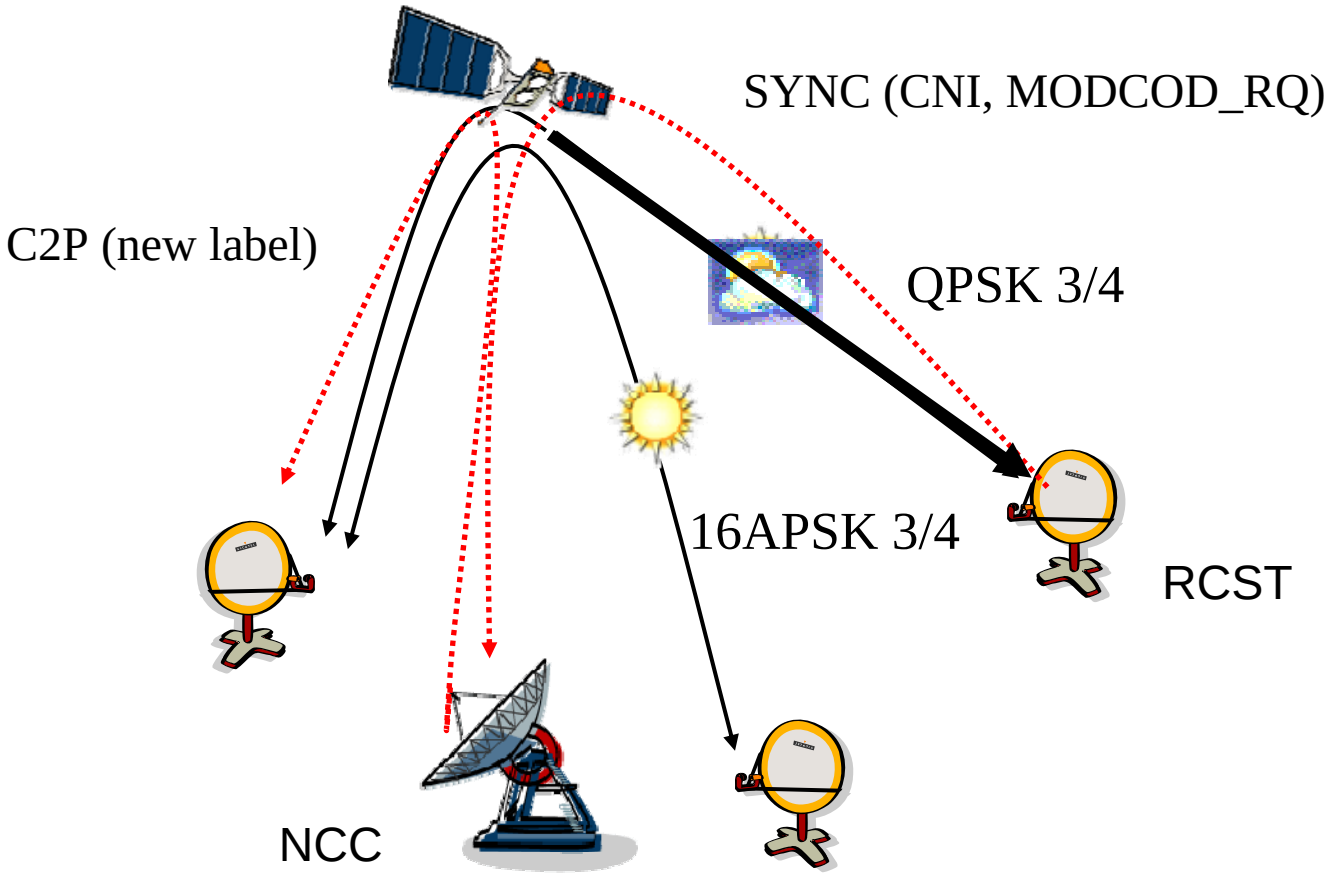


- IPv6
  - Routing/address resolution
  - Multicasting
  - C2P
- ULE/GSE
- NGN QoS: SIP proxy
- Adaptive Coding Modulation Techniques
  - DVB-S2 DL
  - Adaptive RL DVB-RCS
- Hybrid System
  - Transparent+regenerative payload
- WiFi/WIMAX interworking

C2P Connections

- **Connection Control Protocol (C2P) for DVB-RCS systems**
  - RCST/RSGW – NCC signalling
  - Dynamic connectivity
  - Dynamic capacity allocation
  - ARP embedded functionality
  - QoS and SIP functionality
  - DVB-S2 parameters
  - Dynamic multicast group management
  - IPv6

DVB-S2/ACM

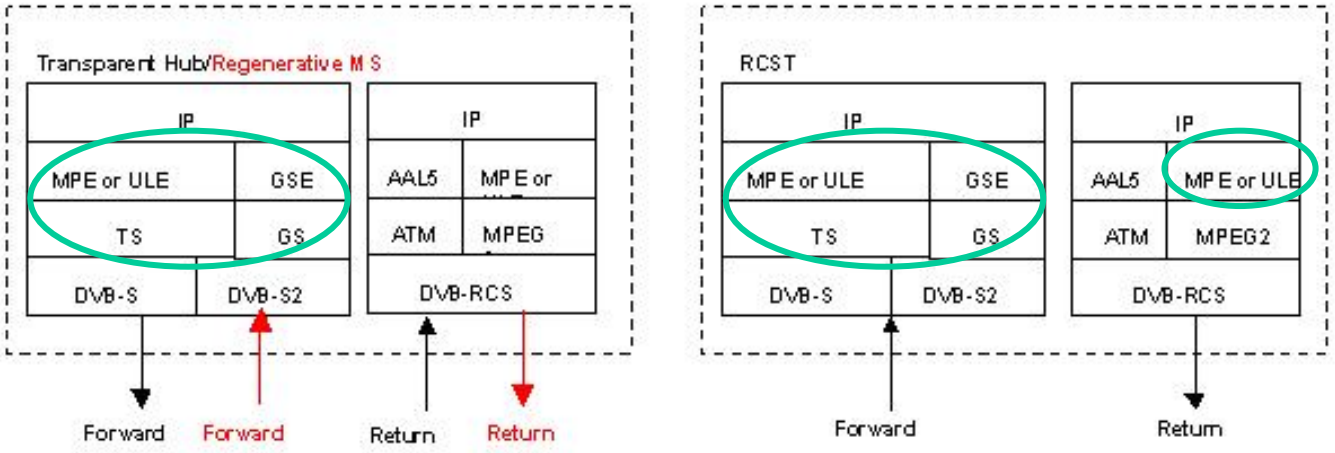


REGENERATIVE TRANSPORT STREAM

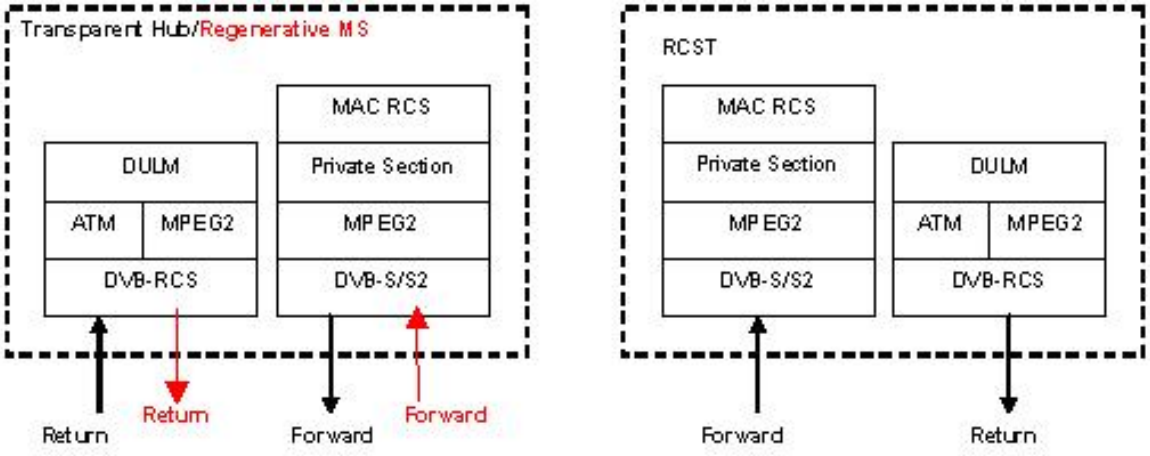
IPv6 DVB-RCS Network

- **IPv6**

User Plane



Control Plane



Hybrid Satellite Platform

TRANSPARENT + REGENERATIVE OPERATION MODES:

- **Loose Integration**: only a common management system for configuring a terminal as transparent or regenerative. Decided at provisioning what system the terminal will use.

- **Medium integration**: The terminal assignment as transparent or regenerative changed by NCC/HUB depending on the service. Logoff of the terminal to change DVB-S2 flow.

- **Tight integration**: collaboration between the NCC / HUB to manage the available resources. If no resources perform the communications with the second best configuration and no switching between platforms.

- **Full integration**. terminals with two DVB-S2 receivers to handle both DVB-S2 streams. Depending on the type of service it will decide to use one path or the other.

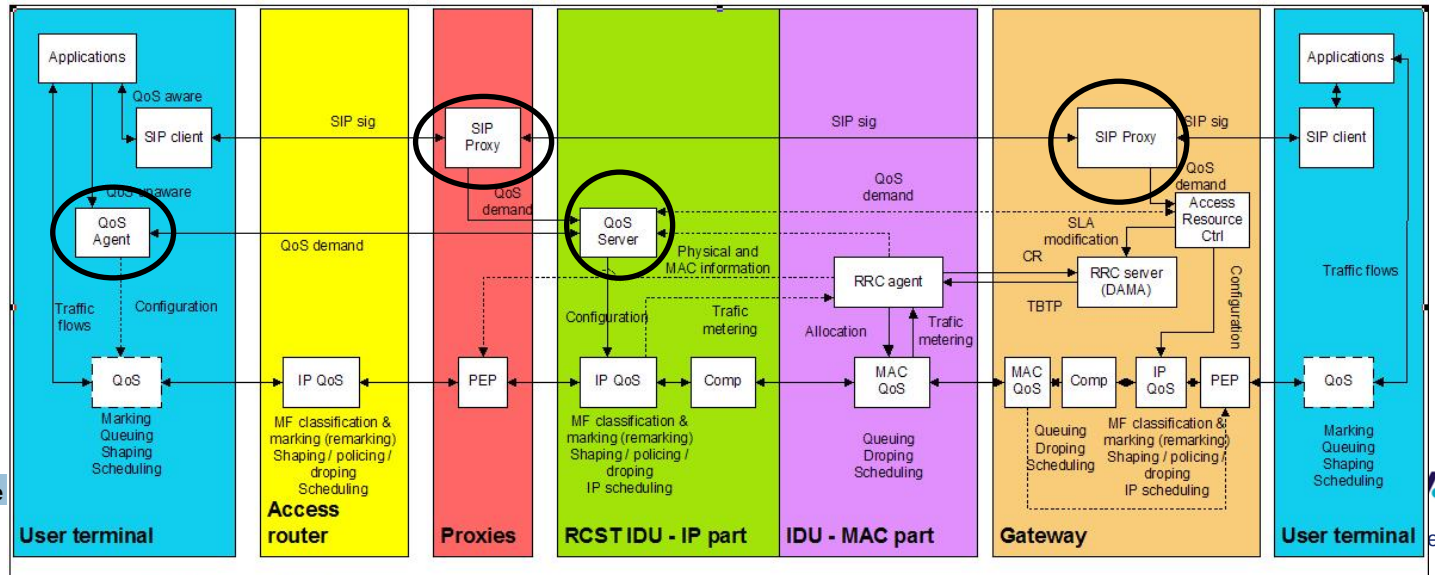
SATSIX option:

medium integration

first step in the development of hybrid solutions.

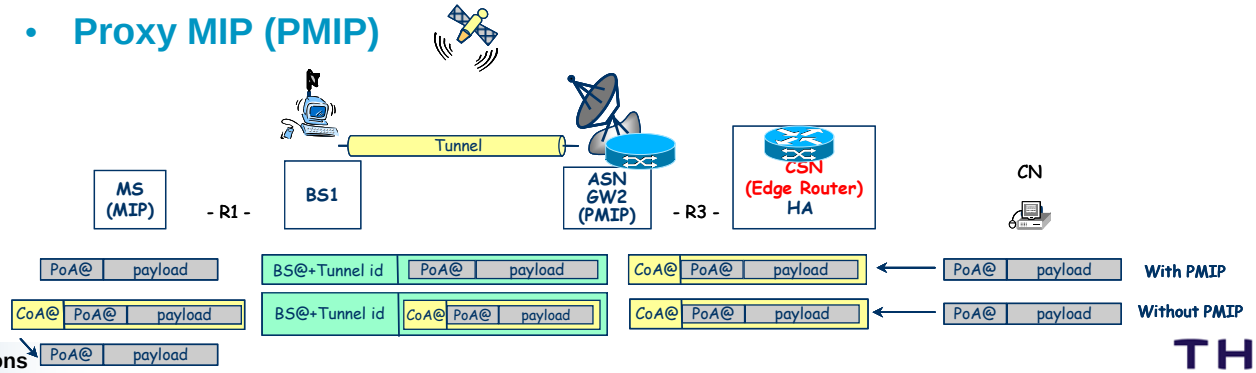
NGN QoS: SIP Proxy

- **Dynamic QoS architecture**
  - **IP oriented**
    - SIP proxies
    - Specific RCST-NCC signalling
    - QoS agent / QoS server / Access Resource Controller
    - Proxies: configure IP and MAC components, no MAC signalling
  - **MAC oriented**
    - Dynamic QoS depends on proxies information (SIP, QoS server)
    - RCST-GW signalling based on C2P



Mobility

- Support of MobileIPv6 and its derivative Hierarchical MIPv6 (HMIPv6).
- Localization of the Access Router (AR)
  - Integrated AR with the satellite terminal/base station
    - more than one subnet behind the satellite terminal/base station
    - HMIPv6 improve the mobility process if moving to another subnet
    - Layer 2 mobility and handover in the WiMAX/WiFi part of the local network
  - Separated with the satellite terminal/base station
    - Layer 2 transport over the satellite
    - Layer 3 mobility anchored in the core network (behind the satellite gateway for a transparent satellite).
    - Mobile IP(v4 or v6) protocol supported in the WiMAX NWG specifications:
      - Client MIP (CMIP)
      - Proxy MIP (PMIP)



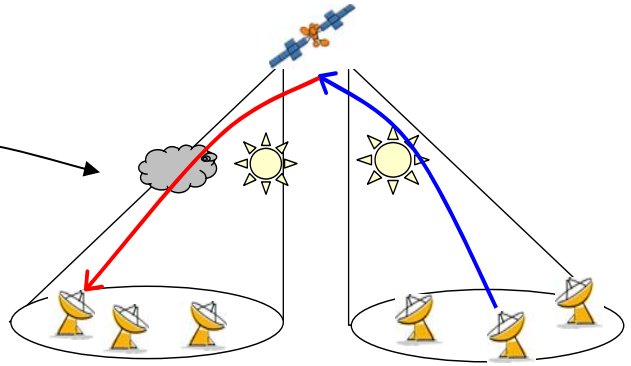
Conclusions

- **SATSIX SATELLITE SYSTEM:**
  - **NEW GENERATION BROADBAND SATELLITE MULTIMEDIA NETWORKS**
- **SATSIX Platforms**
  - Transparent and regenerative satellite networks evolution
- New generation features, new system requirements
  - SATSIX service requirements: residential, collective, corporate
  - IPv6
  - ULE/GSE
  - New generation payloads
    - DVB-S2, ACM
    - Hybrid Payloads
  - Mobility: MIP
  - QoS: SIP and C2P

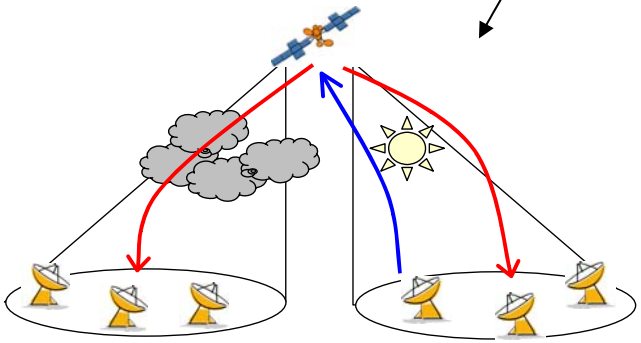
ACM schedulers

FORWARD - LINK

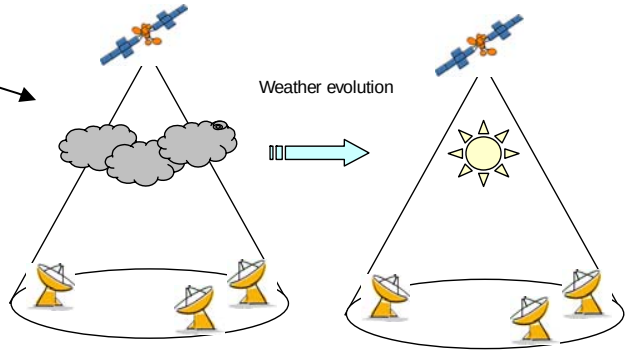
- unicast connection
- satellite coverage
- multicast connection



unicast connection



multicast connection



beam coverage